Get the Scuttlebutt - SLAMR 2.0 $656 Billion Invested in R&D

Mortimore, David

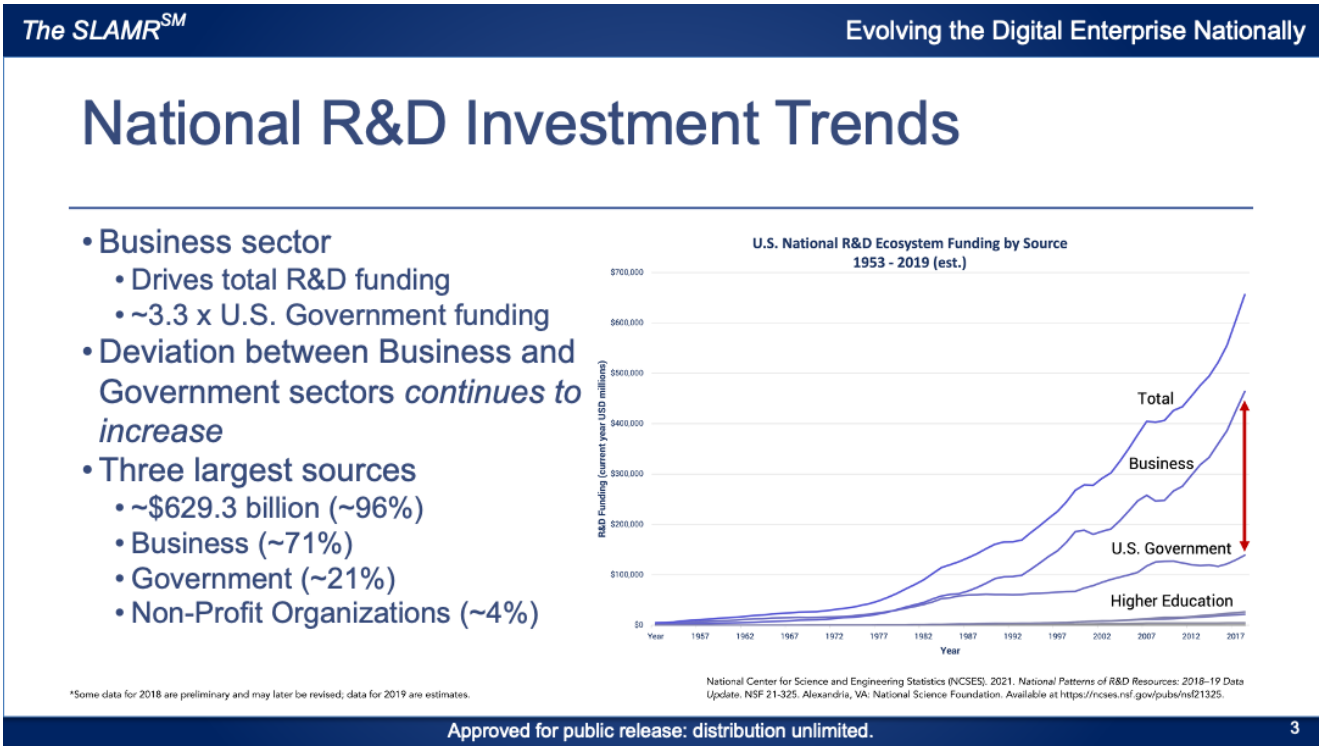
Monterey, California, Naval Postgraduate School

Get the Scuttlebutt - SLAMR 2.0

nps.edu/web/slamr/scuttlebutt

$656 Billion Invested in R&D

Mr. David Mortimore | April 15, 2021



The U.S. Business sector continues to lead national investments in Applied Research and Development efforts, according to data released this week by the National Science Foundation.

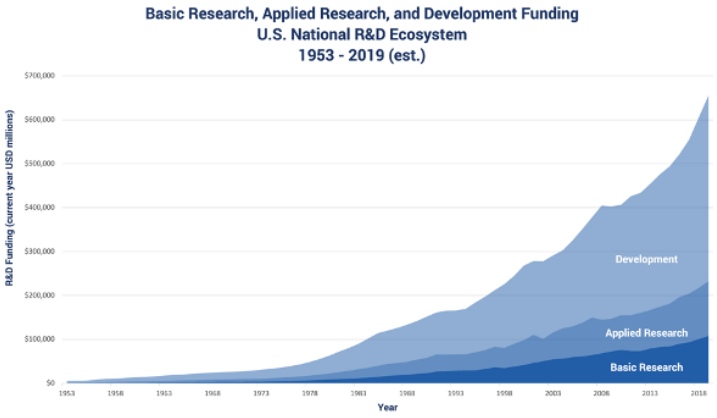
Earlier this week, the National Science Foundation released updated survey data on investments in Research and Development (R&D) by the Business sector, Higher Education organizations, Non-Profit Organizations (NPOs), Federally Funded Research and Development (R&D) Centers, and federal and non-federal governments.

Of the estimated **$656 billion invested in 2019**,

- 16% was in Basic Research,
- 19% was in Applied Research, and
- 65% was in Development.

National R&D Investment Trends

- $656 billion* invested in 2019
  - Basic Research - 16%
  - Applied Research - 19%
  - Development - 65%
- Business sector is the largest investor in
  - Applied Research
  - Development



*Some data for 2018 are preliminary and may later be revised; data for 2019 are estimates.

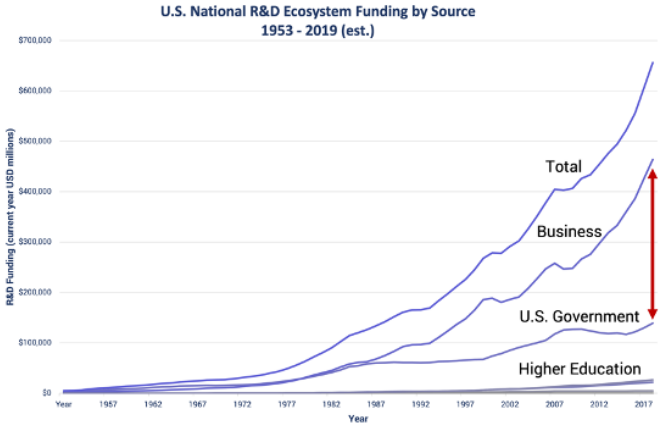
National Center for Science and Engineering Statistics (NCSES). 2021. *National Patterns of R&D Resources: 2018–19 Data Update*. NSF 21-325. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf21325.

The **Business sector continues to out-invest the U.S. Government** at a forecasted rate of 330% in 2019. The Business sector is also the primary investor in Applied Research and Development nationally. For nearly 15 years, the difference between Business sector and U.S. Government investments has widened annually.

The SLAMR[SM] Evolving the Digital Enterprise Nationally

National R&D Investment Trends

- Business sector
  - Drives total R&D funding
  - ~3.3 x U.S. Government funding
- Deviation between Business and Government sectors *continues to increase*
- Three largest sources
  - ~$629.3 billion (~96%)
  - Business (~71%)
  - Government (~21%)
  - Non-Profit Organizations (~4%)



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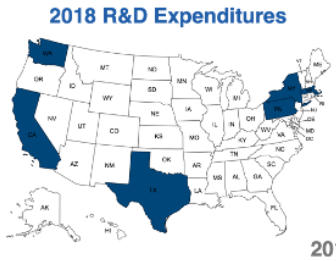
According to the survey data, **California leads the nation in amount of R&D work performed** accounting for approximately 28% of all R&D expenditures in the country. **New Mexico leads the nation by R&D Intensity**, which is the ratio of total R&D expenditures in a

state to its GDP.

Top Performing R&D States (2018)



- Top five states by **expenditures**
  - California - $164,398 (28%)
  - Massachusetts - $35,535 (6%)
  - Washington - $33,815 (6%)
  - Texas - $27,213 (5%)
  - New York - $25,824 (4%)
- Top five states by **R&D Intensity**
  - New Mexico
  - Massachusetts
  - Washington
  - Maryland
  - California

R&D Intensity is the ratio of total R&D performed in a state to its state GDP.

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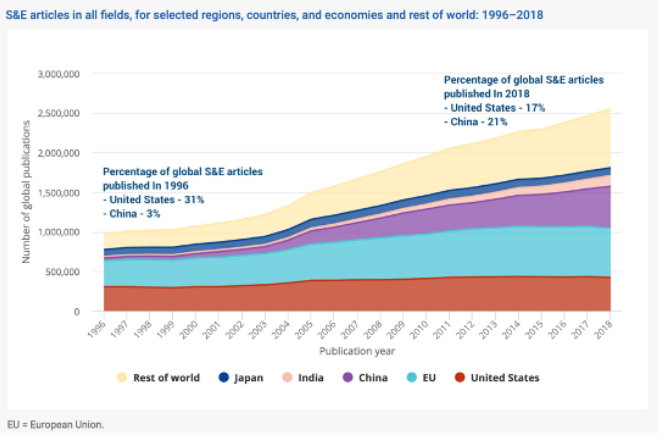
In terms of **Science and Engineering outputs**, as measured in published articles, **the U.S. continues to lose pace against China and the European Union**. In 1996, the U.S. accounted for 31% of all Science and Engineering articles published worldwide. In 2018, the U.S. was responsible for only 17% of articles published, where as the European Union accounted for 24% and China 21%.

Science and Engineering Outputs

- Top global contributors (%)
  - Rest of World - 29%
  - European Union - 24%
  - China - 21%
  - United States - 17%
- Top global contributors (number)
  - Total - 2,555,960
  - Rest of World - 748,183
  - European Union - 622,125
  - China - 528,263
  - United States - 422,808
- United States **is behind** and **continues to lag**

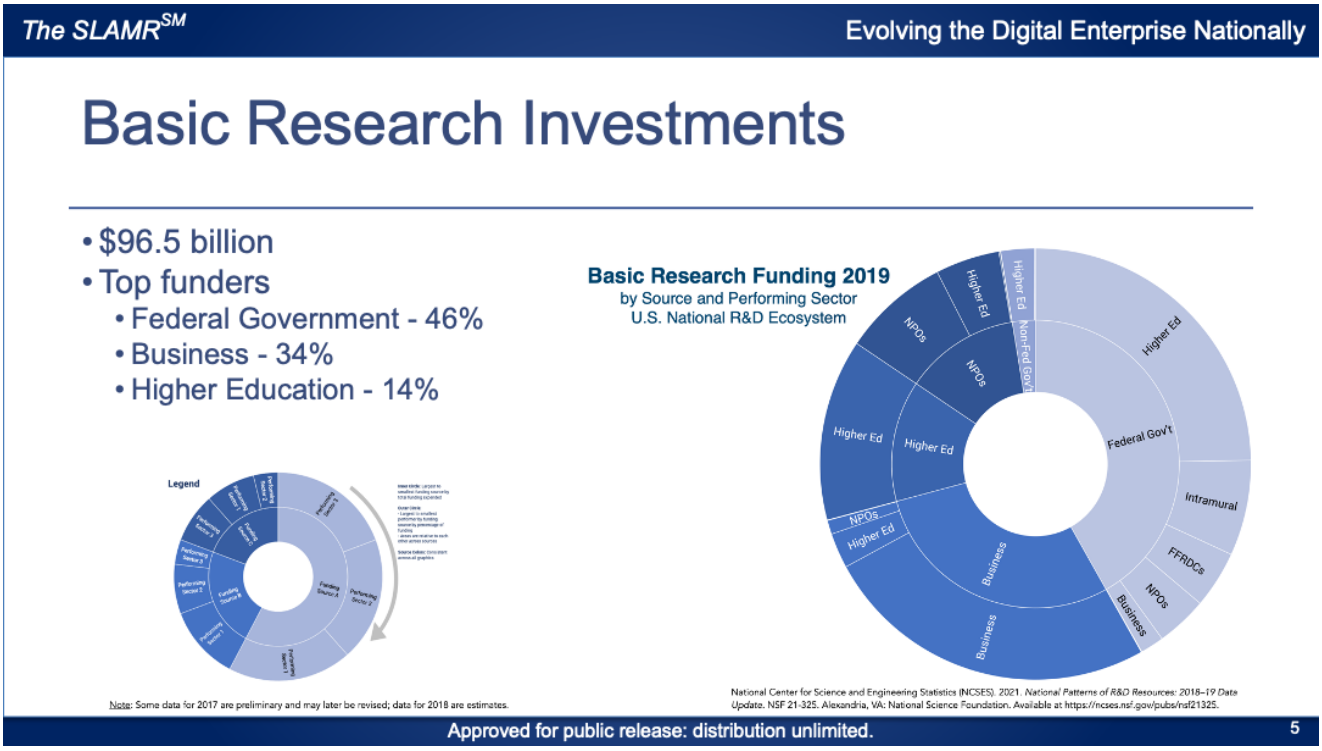


EU = European Union.

National Center for Science and Engineering Statistics, National Science Foundation; Science-Metrix; Elsevier, Scopus abstract and citation database, accessed June 2019.

In **Basic Research**, an estimated $96.5 billion was invested and the top three investors were:

- Federal government - 46%;
- Business sector - 34%; and
- Higher education - 14%.

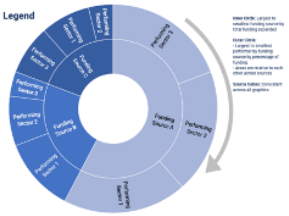


Leadership of the U.S. Business sector in Applied Research and Development investments is pronounced. Of the estimated $124.8 billion invested in **Applied Research**, the top sources of funding were:

- Business - 55%;
- Federal government - 33%; and
- Higher Education and NPOs - 5%, each.

Applied Research Investments

- $124.8 billion
- Top funders
  - Business - 55%
  - Federal Government - 33%
  - Higher Education - 5%
  - Non-Profit Organizations - 5%



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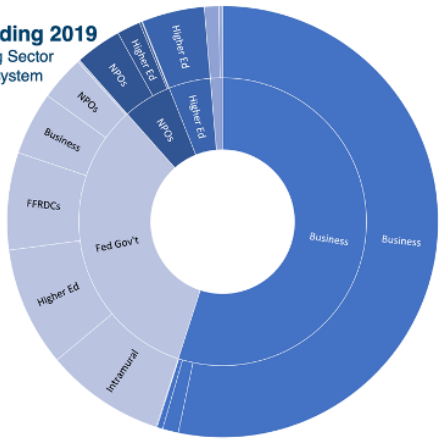
Applied Research Funding 2019
by Source and Performing Sector
U.S. National R&D Ecosystem



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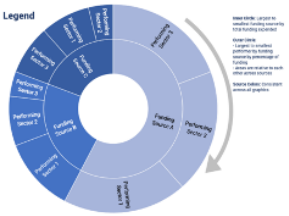
For **Development** activities, the order of the top investment sources was the same, although Business sector dominance is even more apparent. Of the estimated $423 billion, the breakdown is

- Business - 86%;
- Federal government - 13%; and
- Higher Education and NPOs - 1%, each.

Development Investments

- $423.4 billion
- Top funders
  - Business - 86%
  - Federal Government - 13%
  - Higher Education - 1%
  - Non-Profit Organizations -1%



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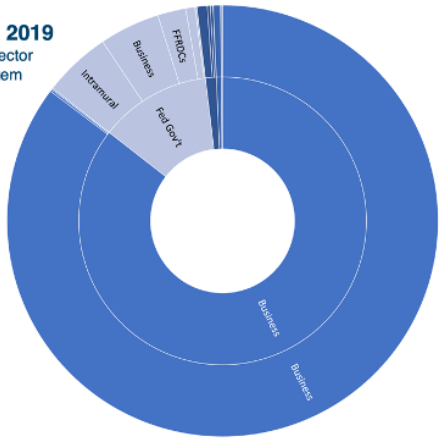
Development Funding 2019
by Source and Performing Sector
U.S. National R&D Ecosystem



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The trends in national R&D investments speaks to the importance of the **Sea Land Air Military Research initiative (SLAMR)** and the **Joint Interagency Field Experimentation Program (JIFX)**. JIFX provides a quarterly venue for Business sector, Academia, NPOs, and state and federal government agencies to collaboratively develop **autonomous systems**, **Machine Learning**, **Artificial Intelligence**, **sensors and sensor networks**, **digital enterprise**, and other technologies. SLAMR provides a thread for global S&T community members between JIFX events, as well as its own suite of all-domain R&D environments, Business Relationship Innovation, and **Digital Enterprise R&D**.

Discover more about **JIFX**, **Thunderstorm**, and **Stiletto**, and upcoming proposal and field experimentation opportunities!

Click **National R&D Investment Trends 1953-2019** for a copy of the overview.